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Telecommunications in Zimbabwe

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NOTE: At the time of publication, the author Anu Vedantham was affiliated with the U.S. Department of Commerce. Currently, she is the Director of the Weigle Information Commons at the Penn Libraries of the University of Pennsylvania.

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Abstract
Telecommunications in many African countries is several years, perhaps decades, behind the state of the art in developed countries. In 1982, nine out of ten people in the United States owned a telephone line; in Africa, only five out of 100 did. Often, telecommunications investments are put on a lower priority at national planning levels in favor of other technologies such as electrification; advances in telecommunications are not often seen as a crucial factor in economic development. However,as the world becomes increasingly dependent on telecommunications for international economic trade and information transfer, the need for modem telecommunications capability becomes more urgent.

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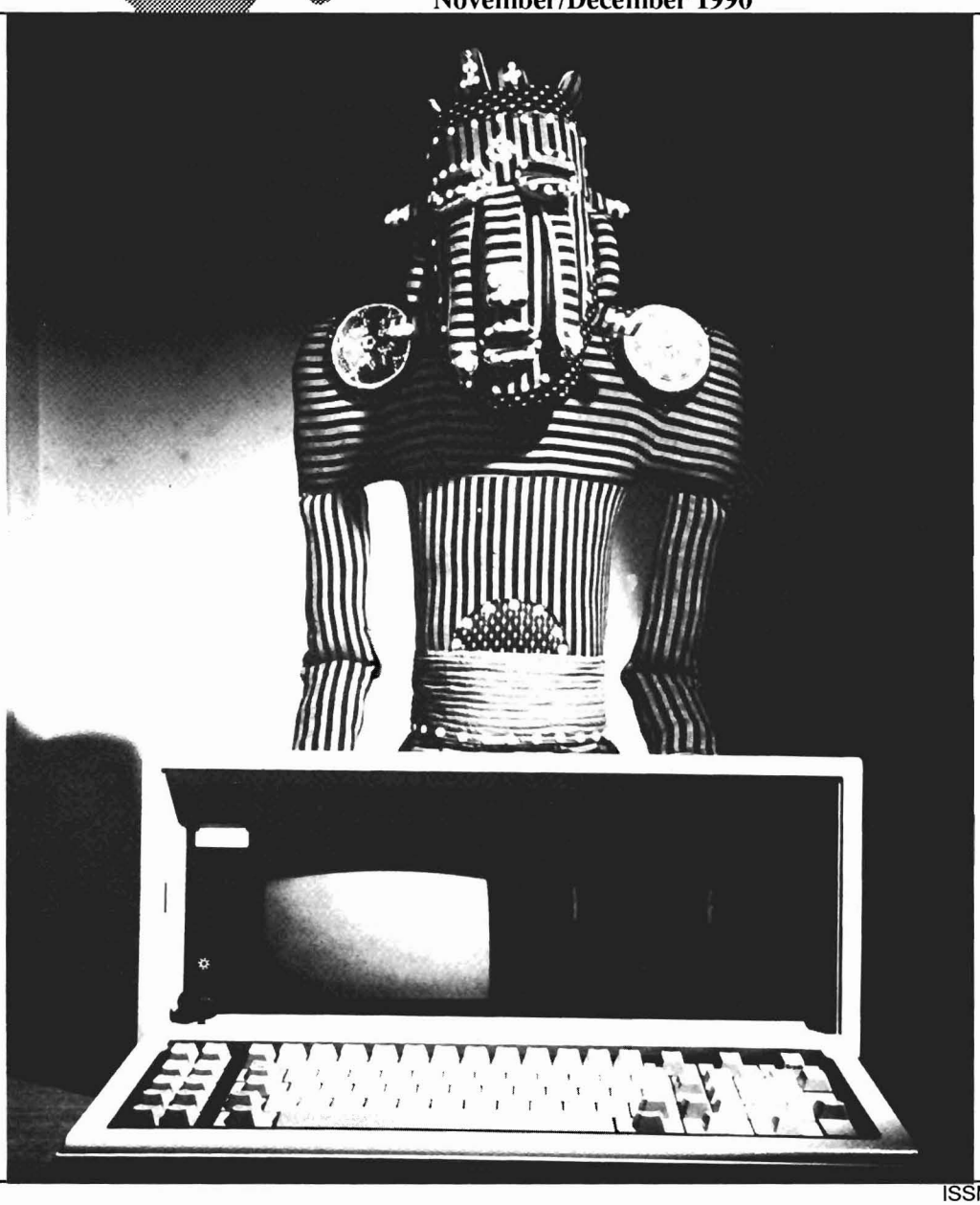

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Telecommunications in Zimbabwe

Anuradha Vedantham

The constraints of applying technological changes in African countries can often produce unbalanced results. Anuradha Vedantham visited Zimbabwe earlier this year and examines the state of telecommunications in that country.

Telecommunications in many African countries is several years, perhaps decades, behind the state of the art in developed countries. In 1982, nine out of ten people in the United States owned a telephone line; in Africa, only five out of 100 did. Often, telecommunications investments are put on a lower priority at national planning levels in favor of other technologies such as electrification; advances in telecommunications are not often seen as a crucial factor in economic development. However, as the world becomes increasingly dependent on telecommunications for international economic trade and information transfer, the need for modern telecommunications capability becomes more urgent.

The structure of Zimbabwe's telephone system is typical of many African countries. The public telephone system in Zimbabwe is run by a government organization, the Posts and Telecommunications Corporation (PTC), that operates on a state-assigned budget. Many private corporations operate on private exchange systems often purchased from private companies.

Technology Profile of the Public System

PTC's public telephone system operates under many serious constraints, including obsolete equipment, lack of local manufacturing of spare parts, and scarcity of foreign exchange.

Mr. Chideme, Chief Switching Engineer of PTC, explained in an interview that almost all the switches in the country are "step-by-step" switches, which are completely mechanical. In contrast, the last switch of this type in the United States was removed from operation at least 6 years ago.

The international sanctions against the Ian Smith regime in Rhodesia left a negative impact on the telephone system. During this time, Zimbabwe (then Rhodesia) was unable to buy telephone equipment. Thus at independence, Zimbabwe inherited a severely outdated, mechanically switched telephone system, while other countries had progressed through the crossbar and electro-mechanical switches before upgrading to the digital switches of today.

Similarly, the wires in the Zimbabwean system could not be replaced, and corrosion in the 40 year old wiring has created serious cross-talk impairment in most of the circuits.

Distribution Profile

The growth of the telephone network has reflected the political and economic trends in the country. Harare, the capital and the largest city, enjoys over half of all telephone lines in the country, and Bulawayo, the second-largest city, gets another 25%. The combined population of the two cities accounts for less than 25% of the total population.

Urban Concerns

Harare, as a rapidly growing city, has been suffering from switching bottlenecks. The expansion of the city has outstripped the growth of switching facilities. Demand for new lines in Harare, especially from the commercial sector continues to outstrip supply. Current exchanges are severely overloaded and in many areas, new telephone lines cannot be installed until existing switching exchanges are replaced with larger ones. The scarcity has resulted in companies retaining their phone numbers when they move from one building to another; this results in entire buildings which cannot be fitted for additional telephone access.

Within Harare, the low-density (higher-income) suburbs receive a much higher proportion of telephones than the high-density (low-income) suburbs. Commercial sectors have an advantage over residential sectors. The distribution decisions are affected by political, economic and budget pressures. PTC's budget competes with many other essential utilities on a national level for scarce foreign exchange, and the need for telecommunications is often not as clearly obvious as the need for other public utilities.

There have been small but significant improvements in the urban telecommunication network since independence, including the installation of a few electro-mechanical switches and one digital switch in Bulawayo. Two percent of the network is now digital, and a 144 Megabyte digital link was installed in 1989 between Harare and Bulawayo. PCM techniques have been implemented on Harare-Bulawayo links to reduce transmission bottlenecks. Television signals are transmitted from Harare to Bulawayo through PTC as well. Inter-regional links to neighboring countries have been installed on microwave channels through funding from Norwegian and Swiss aid agencies. Recently, there has been a high demand for a mobile car telephone service in Harare. Also, within the next 5 years, PTC plans to work with a Japanese company on installing a large digital system for Harare.

Rural Concerns

Telephone installation in rural areas has benefited from a domestically designed and manufactured "party-line" technology which allows up to 24 households to share a single line. This is most cost-effective and highly used, but allows very little privacy. There is a high volume of traffic between rural areas and the cities, since many people visit their home towns over the weekend. As a result, there is great demand from city dwellers for telephones to be installed at the homes of rural relatives.

PTC makes a profit in its urban business which is used to subsidize the rural part. The priority policy of rural installations proceeds in order from police facilities, clinics, large shops to commercial farms. However, most commercial farms have the resources to purchase single lines, while many rural "growth points" do not.

According to Mr. Shonhai, Chief Transmission Engineer of PTC, the weak infrastructure has driven the costs of installing rural lines much higher than those for urban lines. In Harare, it costs roughly Zim$1,200 per line, while one rural installation near Mutoko cost Zim$5.5 million for 400 lines, or roughly Zim$14,000 per line. This, combined with problems of convincing construction companies to start rural projects, inhibits further rural installation.

Part of PTC's future plans include using optical fiber when installing new lines in rural areas. Fiber proves to be cheaper, easier to install, and less vulnerable to theft than traditional copper wire. Previously, copper telephone wires had to be coated with steel in order to deceive would-be thieves.

Planning Needs

Apart from economic hurdles of foreign exchange and obsolete equipment, PTC faces serious shortages of information and planning know-how. For example, the single international switch connecting Zimbabwe to the rest of the world was placed in Gweru on the assumption that the satellite connection would fit there. After the exchange was in place, it became necessary to have the satellite station closer to Harare. As a result, every international call from Harare occupies two trunk channels (one to Gweru and one back) before it reaches the outside world. Also, redundant switching exchanges process these calls, adding to the existing overload conditions.

Another example of the problems being faced is in the installation of underground wiring in Harare. In standard practice, groups of wires are placed in concrete conduits which follow easily accessible routes. In Harare however, thin tubes of 200 wires each are individually buried underground without conduit networks. This causes serious maintenance problems, increasing corrosion and making it very difficult to find and dig up a faulty wire. It also leaves the network very vulnerable to damage from construction and road repairs.

Such mistakes may have been avoided if technical expertise had been available at the time; once these major decisions are made, they are costly to reverse.

Future hurdles

Telecommunications in Zimbabwe suffers from many handicaps. Since the government outlaws modems as a national security measure, no electronic mail contact is possible from Zimbabwe. Facsimile and answering machines must be registered and evaluated by PTC, a long and unreliable process. New lines are a very scarce resource, and a dial tone can often be long in coming. Pay phones stop working when the cash box is full and remain that way for several days until they are manually emptied. Collect calls can be made only to the United States, and then only from a residential phone. The telephone system hasn't graduated to modular jack installations or touch-tone dialing yet.

The challenges faced by PTC are significant. The lack of foreign exchange restricts buying new equipment while the infrastructure demands a huge and urgent overhaul. The need for telecommunications development has yet to be acknowledged in government budget allocation, which itself suffers from foreign exchange scarcity and economic weaknesses.